

FORT COLLINS ADDITIONAL LAND USE CODE AUDIT

MAY 2023

Soils, Xeriscape, Tree
Protection, Tree Canopy

Table of Contents

Part 1: Introduction and Overview	1
About the Project	1
About this Document	2
Part 2: Code Audit Focus Areas	2
1. Soil Amendments	2
Current Standards and Challenges	2
Recommended Changes.....	4
Reorganization for Clarity	4
Substantive Soil Amendment Standards	4
Flexibility and Relief	5
Administration and Enforcement	5
2. Xeriscaping	5
Current Standards and Challenges	6
Recommended Changes.....	7
Limits on Amounts of Irrigated Turf	7
Water Conservation and Irrigation	9
Landscape Materials	10
Streetscape.....	11
3. Tree Protection and Tree Canopy Enhancement	12
Current Standards and Challenges	12
Recommended Changes.....	18
Definitions	18
Tree Preservation	19
Tree Planting	23
Tree Removal Mitigation and Penalties.....	26
4. Additional Recommendations	28

Part 1: Introduction and Overview

About the Project

Since 2020, Clarion Associates has been assisting the City of Fort Collins to implement its Nature in the City (NIC) initiative. To date, that support has included:

- Collaboration with Fort Collins staff to identify four areas of initial focus:
 - Establishing common terms and definitions for the NIC implementation effort;
 - Clarifying and quantifying NIC standards by type and location;
 - Strengthening “edge” standards where possible; and
 - Encouraging other innovative approaches as opportunities arise.
- Preparation of a first Land Development Code Audit to identify barriers to implementing different components of the initiative in these four areas.
- Preparation of draft text amendments to the Land Development Code (LDC) to implement the following aspects of the NIC initiative:
 - Requirements for inclusion of common open space;
 - Limits on impervious surfaces in new development; and
 - Requirements that certain types of development earn at least a minimum number of points in a new Nature in the City Score system, which provides numerous flexible options related to site and building design.
- Expansion of the NIC effort to research four additional topics related to the goals and visions of Nature in the City, namely:
 - Soil amendments to ensure that new vegetation survives, thrives, and provides maximum environmental and experiential benefits;
 - Xeriscape practices to reduce outdoor water consumption without compromising the public experience of being in nature or the environmental benefits that healthy vegetation provides;
 - Tree protection during site work and construction phases and during the creation of landscaping and planting plans for the proposed development and redevelopment; and
 - Tree canopy enhancement in order to increase public perception of nature, increase shading, and reduce the impacts of urban heat islands over time.
- Preparation of an Additional Best Practices Report summarizing our findings and examples of recommended practices in each of these four additional areas. During the preparation of the

report, to avoid repetition of similar materials, we consolidated our research and recommendations on the tree protection and tree canopy enhancements into a single section, and that three-topic structure is carried forward in this document.

About this Document

This document supplements the first LUC Audit prepared in 2020 to reflect the findings of the Additional Best Practice Report on the three additional topic areas. Like the first Audit, and at staff's request, this document does not recommend specific regulatory language to adopt but indicates what types of regulatory changes will be needed and where in the LUC structure those changes will need to appear. In large part, this approach reflects the fact that another consultant has been retained to update the entire Land Use Code, the specific regulatory language to implement the NIC program needs to be consistent with the structure and terminology developed by the lead code consultants, and that work is still in process. We recommend that the findings of this Additional LUC Audit (as well as the first Audit and our first round of Draft Code Amendments) be provided to the lead code consultant for use in their drafting process.

Part 2: Code Audit Focus Areas

1. Soil Amendments

This section identifies potential changes to the Municipal Code to support compliance and enforcement of existing soil amendments regulations and provide additional flexibility to applicants where possible to reflect site-specific considerations.

Current Standards and Challenges

Unlike most other topics addressed during the NIC process, Fort Collins' soil amendment regulations are found in both the Land Use Code and the Municipal Code. The relevant regulations are shown below:

Land Use Code Section 3-8-21, Soil Amendments

For any development project, prior to installation of any plant materials, including but not limited to grass, seed, flowers, shrubs or trees, the soil in the area to be planted shall be loosened and amended in a manner consistent with the requirements of City Code Section 12-132(a), regardless of whether a building permit is required for the specific lot, tract or parcel in which the area is located. A certification consistent with the requirements of City Code Section 12-132(b) shall be required for the area to be planted. This requirement may be temporarily suspended or waived for the reasons and in the manner set forth in City Code Sections 12-132(c) and (d).

Municipal Code Section 12-132, Soil Amendment

- (a) Except as otherwise provided below, the holder of any building permit shall, as a condition of the issuance of a certificate of occupancy, prepare any area in which any plant materials, including but not limited to grass, seed, flowers, shrubs, or trees, are expected or intended to be installed, prior to installation of any plant materials in that area, as follows:
- (1) The soil in such areas shall be thoroughly loosened to a depth of not less than eight (8) inches; and
 - (2) Soil amendments shall be thoroughly incorporated into the soil of such areas to a depth of at least six (6) inches by tilling, discing or other suitable method, at a rate of at least three (3) cubic yards of soil amendment per one thousand (1,000) square feet of area to be planted, unless at least four (4) inches of loose top soil has been placed on the area after completion of construction activity on top of not less than four (4) inches of loosened subgrade soils. Documentation of the content and quantity of the soil amendments and topsoil placed in an area, prepared by the commercial source of the material or a qualified soils testing laboratory, shall be submitted in connection with the certification required in Subsection 12-132(b), below.
- (b) Prior to the issuance of any certificate of occupancy, the prospective recipient of such certificate of occupancy shall submit written certification to the Utilities Executive Director that all planted areas, or areas to be planted, have been thoroughly loosened and the soil amended, consistent with the requirements set forth in this Section.
- (c) In the event that the Utilities Executive Director determines that compliance with this Section is rendered unreasonably difficult by weather or seasonal conditions, the Utilities Executive Director may temporarily suspend the application of this requirement, contingent upon the provision by the prospective recipient of such arrangements, guaranties or assurances as the Utilities Executive Director determines to be adequate to ensure compliance.
- (d) In the event that the Utilities Executive Director determines that compliance with this Section in a specific area is unreasonably difficult as a result of site conditions such as, for example, an excessively steep gradient or a very narrow side lot, the Utilities Executive Director may waive the application of this requirement for such area.
- (e) The Utilities Executive Director or City Manager may inspect any property in order to determine compliance with the requirements of this Section as a condition of issuance of any certificate of occupancy.
- (f) Payment of any administrative fee established by the City Manager for the purpose of recovering the costs of administering and enforcing the requirements of this Section shall be required as a condition of issuance of any building permit, excluding any building

permit where it can be shown that no areas within the project limits will be disturbed by construction activities and planted with vegetation.

These provisions commingle substantive regulations (Subsection (a)) with opportunities for flexibility or relief from those regulations (Subsections (c) and (d)) and procedures to administer the regulations (Subsections (b), (e), and (f)).

Recommended Changes

Reorganization for Clarity

The content currently contained in Section 12-132 of the Municipal Code should be reorganized into the following three new subsections for clarity:

- Section 12-132: Substantive Soil Amendment Standards
- Section 12-133: Flexibility and Relief
- Section 12-134: Administration and Enforcement

Substantive Soil Amendment Standards

This revised Section should include current Subsection 12-132(a) but with the following changes:

- The text of Subsection 12-132(a) should be revised to clarify that it applies when soil has not been tested to identify deficiencies.
- As alternatives to the requirement of Subsection (a), add provisions allowing the following:
 - If topsoil that has been tested and confirmed to meet the minimum soil amendment standards, allow the topsoil to be stored on site (using best storage practices) and then reapplied to the site after subgrade soils have been loosened;
 - If topsoil has been tested and found not to meet the minimum soil amendment standards, allow the topsoil to be stored on site (using best storage practices), amended to bring it up to those minimum standards, and then reapplied to the site after subgrade soils have been loosened.
- As exceptions to the requirements of Subsection (a), the revised Section could include the following:
 - To avoid damage to root systems, remove the require for soil amendment in areas around new and existing trees, provided that topsoil in those areas has been loosened following construction activities;
 - To avoid potential erosion and pollution, do not require soil amendments within 25 feet of any perennial waterway; and
 - To encourage the retention of existing vegetation and their established root systems, do not require soil amendments in areas where existing vegetation is retained.
 - To simplify administration, do not require soil amendment in planting areas smaller than 1,000 square feet in areas.

Flexibility and Relief

- Add a new Section 12-133 consolidating provisions related to available flexibility. These provisions will allow soil amendment requirements to be tailored to the specific needs of each site and will remove common barriers to compliance. This new Section should include current Subsections 12-132(c) (temporary delays due to weather conditions) and (d) (waivers due to impracticability).

In addition, this new Section should include the following provisions:

- On larger projects, where the applicant for a Certificate of Occupancy is unrelated to the entity responsible for installing landscaping, allow Certificates of Occupancy to be issued even if required soil amendments have not been installed, provided that one of those entities has provided the City financial guarantees or other assurances that the soil amendments will be completed when landscaping is installed.
- In site areas where (a) site compaction did not occur during construction, and (b) required or planned landscaping will be installed as plug installations, container plantings, overseeding applications, or xeriscaping, allow soil aeration or other no-till soil treatments as an alternative to soil amendments.

Administration and Enforcement

- Add a new Section 12-134 consolidating provisions related to administration and enforcement of the revised regulations. This new Subsection should include current Subsections 12-132(b) (written certification of performance), (e) (allowance of inspections), and (f) (administrative fee payment).

In addition, the new Subsection should include the following provisions:

- Applicants should be allowed to document compliance with the regulations through submittal of photos along with soil amendment load tickets or affidavits.
- Simplify the inspection process by conducting a single inspection to verify soil amendment, tilling depth, and other standards are addressed.
- Establish the amount of the administrative fee already authorized by Subsection 12-132(f) and begin collecting that fee.

Importantly, because the provisions of current Section 12-130 through 132 are only relevant to landscaping and all other landscaping provisions are located in the LUC, we recommend that those provisions (as modified by the changes listed above) be relocated from the Municipal Code to the Land Use Code. They should appear as a new general landscaping standard (applicable to all required landscaping) as a new Subsection 3.2.1(E)(4) Soil Amendments. Subsequent subsections should be renumbered accordingly.

2. Xeriscaping

This section focuses on issues identified by City staff related to landscaping and water conservation following review of the Additional Targeted Best Practices Report (May 2022) and internal discussions.

Current Standards and Challenges

These recommendations build on, and should be coordinated with, the current LUC regulations on landscaping, irrigation, and water conservation. More specifically, they build on the following current LUC regulations:

Section 3.2.1(E) Landscape Standards

...

“(3) *Water Conservation*. Landscape plans shall be designed to incorporate water-efficient techniques.

“(a) Landscape designs shall be designed according to the xeriscape landscaping principles described as follows:

- (1) Plan and design. Plan for how people will use and interact with the landscape. Group landscape materials accordingly based upon hydrozone.
- (2) Landscape arrangement. Provide a cohesive arrangement of turf, plants, mulch, boulders, and other landscape elements that support the criteria in Section 3.2.1(H). Landscape elements shall be arranged to provide appropriate plant spacing and grouping and to avoid disproportionate and excessive use of mulch areas.
- (3) Appropriate use of turf. Limit high water-use turf to high-traffic areas where turf is functional and utilized.
- (4) Appropriate plant selection. Selected plants shall be well adapted to the Fort Collins climate and site conditions. Plants shall be grouped according to water and light requirements.
- (5) Efficient irrigation. Design, operate and maintain an efficient irrigation system. Select equipment appropriate to the hydrozone. Water deeply and infrequently to develop greater drought tolerance.

...

(9) Xeriscape principles do not include or allow artificial turf or plants; paving of areas not used for walkways, patios, or parking; excessive bare ground or mulch; weed infestations; or any landscaping that does not comply with the standards of this section.

(b) Landscape plans shall include:

1. A water budget chart that shows the total annual water use, which shall not exceed an average of fifteen (15) gallons/square foot for the landscape.
 - a. Accurate and clear identification of all applicable hydrozones using the following categories:

High Hydrozone	18 gallons/square feet/season
Moderate Hydrozone	10 gallons/square feet/season
Low Hydrozone	3 gallons/square feet/season
Very Low Hydrozone	0 gallons/square feet/season

Section 3.2.1 (J) Irrigation

“(1) Provision shall be made for permanent, automatic irrigation of all plant material, with the following exceptions:

- (a) plantings that do not require any irrigation beyond establishment.
- (b) trees and other plants used to landscape a residential local street parkway abutting lots for single-family detached dwellings.”

...

“(3) The City of Fort Collins irrigation system standards for water conservation are as follows:

- (a) Irrigation methods and layout:
 1. The irrigation system shall be designed according to the hydrozones shown on the landscape plan.
 2. Each zone shall irrigate a landscape with similar site, soil conditions and plant material having similar water needs. To the extent reasonably feasible, areas with significantly different solar exposures shall be zoned separately.
 3. Turf and non-turf areas shall be irrigated on separate zones.
 4. On steep grades, an irrigation method with a lower precipitation rate shall be used in order to minimize runoff, and, to the extent reasonably feasible, these areas shall be zoned separately.
 5. Drip, micro-sprays, spray heads and rotors shall not be combined on the same zone.
 6. The irrigation method shall be selected to correlate with the plant density. Drip irrigation or bubblers shall be used for sparsely planted trees and shrubs, and rotors, sprayheads and multi-jet rotary nozzles shall be used for turfgrass.

Recommended Changes

Limits on Amounts of Irrigated Turf

Although existing standards limit the total annual water use on a given site to an average of 15 gallons/square foot/year for each water tap, there are currently no limits on the amount of residential and commercial sites on which irrigated turf can be installed. The 2020 LUC Code Audit addressed this shortcoming directly, stating that the City should:

“Make water conservation standards stronger by requiring a minimum percentage of qualifying native or xeric plantings, and by restricting the overall amount of turf grass allowed in the context of landscaping and open space requirements;”

We recommend that limits similar to those applied in some comparison communities be included, both to reduce water demand and to encourage the installation of more natural landscapes consistent with the NIC program goals. These limits should be integrated as a new Subsection 3.2.1(E)(3)(c), Limitations on Irrigated Turf, and should include the following content:

- On non-residential properties (including commercial, institutional, and industrially zoned lands) irrigated turf shall be limited to no more than 30 percent of the total landscaped area, not to exceed a maximum of 10,000 square feet of irrigated turf on the lot or parcel.
- On residential properties (including both single-family and multi-family development) irrigated turf shall be limited to (a) no more than 30 percent of any area front yard area, and (b) no more than 1,000 sq. ft. of the lot or parcel.
- In order to avoid water waste that occurs through overspray on small areas, on both residential and non-residential properties irrigated turf shall not be installed:
 - In contiguous areas smaller than 300 sq. ft.; or
 - In parkway areas between the sidewalk and street.

While the current LUC regulations do not apply to detached single-family homes, it is important that the revised regulations do so, since that land use often occupies more than one-half of the developed land. Because a substantial portion of Fort Collins occupied by this one land use, requiring that single-family homes install more natural landscaping suitable for survival in Colorado’s climate without irrigation can make a large contribution to the NIC goals of more frequent and consistent exposure to natural environments. The Additional Best Practices Report documents the ways in which cities such as Aurora, Castle Rock, and Albuquerque have already imposed similar limitations on irrigated turf.

In addition, the LUC should be revised to clarify what level of development or redevelopment should trigger the application of these turf limits. We recommend that they apply to:

- All projects involving the construction of new primary buildings on vacant land;
- All redevelopment involving the expansion of the gross floor area of an existing primary building by more than 25 percent;
- All redevelopment expanding the number of parking spaces on a lot or parcel by more than 25 percent; and
- All redevelopment involving changes to the exterior of primary structures in which the total value of building permits exceeds 25 percent of the current fair market value of the property, as shown in current property tax records.

For internal consistency, Subsection 3.2.1(J)(1) should be revised by the addition of a Subsection (c) clarifying that the general requirement for installation of landscape irrigation systems does not

apply to areas where irrigation is prohibited pursuant to proposed new Subsection 3.2.1(E)(3)(c) above.

In addition, for internal consistency, Subsection 3.2.1(E)(2) should be deleted, as it contains inconsistent provisions regarding the installation of irrigated turf.

Water Conservation and Irrigation

Increasing the exposure of Fort Collins residents to natural environments will require that more of the landscaping installed in the future be water conserving or xeric landscaping, and that any irrigation installed for non-turf landscaping be highly water efficient. The City's current standards for irrigation installation and design are found in Section 3.2.1(J), and could be strengthened and better aligned with the NIC goals and vision by:

- Removing the Subsection 3.2.1(J)(1)(b) exemption from irrigation for trees and other plants used to landscape a residential local street parkway abutting lots for single-family detached dwellings. In most cities, these types of frontages make up a significant percentage of overall street frontage, and ensuring that trees and vegetation planted in these areas have a high likelihood of survival would make a major contribution to the achievement of NIC goals;
- Adding a new Subsection 3.2.1(J)(3)(a)7 requiring that drip irrigation be installed for all new trees in parkways and front yard areas and whenever the submittal of a landscaping plan is required;
- Clarifying where and when the water efficient irrigation equipment and design standards in Section 3.2.1(J)(3) apply. More specifically, clarifying:
 - Whether they apply to all irrigation installed on single-family detached dwelling lots (many cities would not do so because of limited administrative and enforcement capacity); and
 - Whether they apply to redevelopment projects. We recommend they apply in the same situations where the irrigated turf limits described above apply.

Although some have suggested that the LUC contain a prohibition on overhead irrigation (i.e., non-drip irrigation) between 10:00am and 6:00pm to reduce evaporation, Clarion does not recommend including such a standard in the LUC. This type of standard is likely to change over time and vary by season, weather, and drought events. These types of operational standards are generally adopted in a City Council resolution or regulation that is then cross-referenced in the Code.

To achieve this level of flexibility:

- A new LUC Subsection 3.2.1(J)(4), Overhead Watering Restrictions, could be added to clarify that City Council can, by resolution, limit the hours when overhead watering (i.e., non-drip irrigation) may occur, and that a violation of that resolution is a violation of the LUC. If further detail is needed, the new subsection could also state that unless and until the City Council adopts such a resolution, overhead watering is prohibited between 10:00am and 6:00pm.

As a corollary to the recommendation above, Fort Collins may want to remove some of the highly detailed standards in Subsections 3.2.1(J)(3)(b) Equipment Selection, (c) Sleeving, (d) Water

Pressure, and (E) Sprinkler Performance Audit from the LUC and instead list them in a regulatory administrative manual. These standards are significantly more detailed than those found in many newer codes and could require significant changes over time if irrigation technology and best practices advance. It is generally significantly easier and quicker to update a City Council-authorized manual of technical standards that is maintained outside the Code than to update the Code itself.

Although a suggestion was made to include a prohibition on overhead watering between 10:00 am and 6:00 pm to reduce evaporative water losses, we generally do not recommend including such a provision in the LUC. Most communities include those types of operational restrictions in a technical manual or document cross-referenced in the code, because the specific times of watering restrictions may change over time, and it is easier to amend technical standards outside the code than to make amendments to the code itself.

Landscape Materials

Although Subsection 3.2.1(E)(3)9 states that xeriscape principles do not include artificial turf and plants, staff noted that this standard is often interpreted to apply only to developments implementing xeriscaping, instead of to all scenarios. In addition, while Subsection 3.2.1(D)(3) includes species diversity requirements for trees, there is no similar requirement for shrubs, grasses, ground covers, or other required plantings. Because plants indigenous to Colorado are generally relatively drought-resistant, provisions that require the use of drought-resistant species will help ensure that installed landscaping survives drought events and the ability to experience nature remains uninterrupted. To further increase exposure of Fort Collins residents to nature throughout the city, the current prohibition on artificial turf should be clarified and requirements for species diversity and the use of drought-resistant species should be strengthened. This will require the following changes to Section 3.2.1(I), Landscape Materials.

- Add a new Subsection 3.2.1(I)(10) stating that the use of artificial turf and plants are prohibited in any area required to be landscaped.
- Add a new Subsection 3.2.1(I)(11) stating that in any area required to be landscaped, the landscape materials shall (a) comply with the tree diversity provisions in Section 3.2.1(D)(3) and (b) ensure that each landscaped area between 500 and 1,000 sq. ft. in size contains at least two species of shrubs, and that each landscaped area larger than 1,000 sq. ft. in size contain at least one additional shrub species for each additional 1,000 sq. ft. or part thereof.
- Subsection 3.2.1(I)(2) already requires that plant materials be selected from the *City of Fort Collins Plant List* created by Fort Collins Utilities Customer Connections Department, and we assume that list requires the use of many native, Waterwise, and drought-resistant species. If it does not, then the list should be revised to do so. We do not recommend that Subsection 3.2.1(I)(2) be revised to reference drought-resistant species separately, since that could create confusion as to whether that requirement is in addition to or may conflict with the City's cross-referenced *Plant List*. Most newer land use codes do not try to list all required or encouraged species, but instead include them in a cross-referenced manual outside the Code.

- In addition, the list of prohibited tree species in Municipal Code Section 27-18 should be incorporated into the *Plant List*, or LUC 3.2.1(l)(2) should be revised to also cross-reference the prohibition. In general, all of the information listing prohibited and permitted tree species should be found in one place to make that information easier to find and to simplify updating that information the future.

In addition, experiencing natural areas along the Front Range generally involves exposure to a significant amount of living (rather than inorganic) material. The LUC currently contains very few standards addressing how non-turf areas are to be landscaped and could be strengthened by requiring a minimum amount of landscape material. When combined with the current tree diversity standards and the recommended shrub diversity standards, requirements for at least a minimum amount of live material in these areas could make a significant contribution to the experience of nature in Fort Collins.

- Add a new Subsection 3.2.1(E)(2)(f) stating that not less than 50 percent of the surface of each landscaped be covered with live landscaping or plant material at maturity. Renumber the current Subsection 3.2.1(E)(2)(f) to (g).

Please note that the first NIC Audit of the LUC in 2020 also recommended that the new Common Open Space regulations include the following text:

“All common open space areas required to be vegetated or landscaped pursuant to this section or pursuant to other requirements of the Land Development Code shall use native, non-invasive, and xeric or low water use plant species to the maximum extent practicable.”

Streetscape

The applicability of streetscape standards is often a source of confusion in land use regulation, because it is unclear whether parkway areas (generally those areas between a detached sidewalk and the curb) are subject to general landscaping standards applicable to private property, or are instead subject to separately adopted streetscape standards generally designed to be applied when a street is created, widened, or reconstructed. In many communities, it depends on who owns the parkways; privately owned parkways are subject to the landscaping standards in zoning regulations and publicly owned parkways are subject to separately adopted streetscape standards. We assume this is the case in Fort Collins, but this source of confusion should be clarified as the City’s new Land Use Code as drafted. Because the use of turf on privately owned parkways was addressed above, this section will address separately adopted parkway standards related to the creation, widening, or reconstruction of streets.

Most of the City’s streetscape standards appear in Appendix C of the Larimer County Urban Area Street Standards, although there are also numerous references to the Prospect Road Streetscape Program. To maximize exposure to Nature in the City, each of the streetscape standard documents applicable in the City or the Urban Area should be made consistent with the recommendations for private property listed above. If they do not already do so, the streetscape standards should be revised to clarify that the following LUC provisions and recommendations discussed above apply to publicly owned parkways and medians.

- The prohibition on the use of irrigated turf. Currently, both cool season long grasses (Kentucky Bluegrass, Tall Fescue, Perennial Ryegrass, and Wheatgrass) and warm season native short grasses (Buffalograss and Blue Grama) are permitted to be planted in parkways, which is inconsistent with the recommendations for private property above.
- The requirements for use of drip irrigation and high efficiency irrigation equipment;
- The prohibition on the use of artificial turf and plants;
- The requirements for tree and shrub diversity; and
- The requirement to select plants from the *City of Fort Collins Plant List* created by Fort Collins Utilities Customer Connections Department.

3. Tree Protection and Tree Canopy Enhancement

This section of the Audit focuses on regulations related to tree protection and tree canopy enhancement based on staff and consultant discussions following review of the Additional Targeted Best Practices Report (May 2022). Staff identified ten themes to be addressed in this Additional LUC Audit.

- Tree inventories required prior to conceptual review;
- Tree preservation during construction;
- Tree preservation for single-family residential development (including ADUs and carriage houses);
- Ash tree preservation;
- Heritage tree program;
- Street tree escrow for right-of-way tree establishment;
- Species diversity requirements;
- Parking lot heat island mitigation;
- Tree mitigation; and
- Penalty for tree removal after commercial development.

In addition to the ten themes identified for Forestry Division, this portion of the audit addresses one key definition that needs to be addressed in order to achieve the goals of the Nature in the City program.

Current Standards and Challenges

The current Fort Collins regulations related to these topics are listed below.

Section 5.1.2 Definitions

- Tree, significant shall mean any tree with a DBH of six inches or more.

Section 3.2.1(D)(1)(c) “Full tree stocking” means:

- In all “landscape areas” within 50 feet of any building or structure.

- “Landscape areas” occur along all high use or high visibility sides of any building or structure—extending at least seven feet from any building or structure wall and containing at least 55 square feet of nonpaved ground area.
- For street trees:
 - Planting cutouts in walkways shall contain at least 16 square feet.
 - Planting cutouts, planters, or other landscape areas for tree planting shall be provided within any walkway that is 12 feet or greater in width adjoining a vehicle use area that is not covered with an overhead fixture or canopy that would prevent growth and maturity.
- Full tree stocking shall mean formal or informal groupings of trees planted according to the following min./max. spacing dimensions:
 - Canopy shade trees 30'—40' spacing
 - Coniferous evergreens 20'—40' spacing
 - Ornamental trees 20'—40' spacing
- Exact locations and spacings may be adjusted at the option of the applicant to support patterns of use, views, and circulation as long as the minimum tree planting requirement is met.
- Canopy shade trees shall constitute at least 50 percent of all tree plantings.
- Trees required for parking lot landscaping and street trees may be used to contribute to this standard.

Section 3.2.1(D)(2) Street Trees

Planting of street trees shall occur in the adjoining street right-of-way, except as described in subparagraph (b) below, in connection with the development by one (1) or more of the methods described in subparagraphs (a) through (d) below:

- (a) Wherever the sidewalk is separated from the street by a parkway, canopy shade trees shall be planted at thirty-foot to forty-foot spacing (averaged along the entire front and sides of the block face) in the center of all such parkway areas. If two (2) or more consecutive residential lots along a street each measure between forty (40) and sixty (60) feet in street frontage width, one (1) tree per lot may be substituted for the thirty-foot to forty-foot spacing requirement. Such street trees shall be placed at least eight (8) feet away from the edges of driveways and alleys, and forty (40) feet away from any streetlight and to the extent reasonably feasible, be positioned at evenly spaced intervals.
- (b) Wherever the sidewalk is attached to the street in a manner that fails to comply with the Larimer County Urban Area Street Standards, canopy shade trees shall be established in an area ranging from three (3) to seven (7) feet behind the sidewalk at the spacing intervals as required in Subsection (a) above. Wherever the sidewalk is attached to the street and is ten (10) feet or more in width, or extends from the curb to the property line, canopy shade trees shall be established in planting cutout areas of at least sixteen (16) square feet at thirty-foot to forty-foot spacing.

- (c) Ornamental trees shall be planted in substitution for the canopy shade trees required in Subsection (D)(2)(a) and (b) above where overhead lines and fixtures prevent normal growth and maturity. Ornamental trees shall be placed at least fifteen (15) feet away from any streetlight.
- (d) Wherever existing ash trees (*Fraxinus* species) are in the adjoining street right-of-way, the applicant shall coordinate and obtain an onsite analysis with the City Forester to determine replacement canopy shade trees either through shadow planting or other emerald ash borer mitigation methods.

Section 3.2.1(D)(2)(d)

- Wherever existing ash trees (*Fraxinus* species) are in the adjoining street right-of-way, the applicant shall coordinate and obtain an onsite analysis with the City Forester to determine replacement canopy shade trees either through shadow planting or other emerald ash borer mitigation methods.

Section 3.2.1(D)(3), Minimum Species Diversity

To prevent uniform insect or disease susceptibility and eventual uniform senescence on a development site or in the adjacent area or the district, species diversity is required, and extensive monocultures are prohibited. The following minimum requirements shall apply to any development plan.

Number of trees on site	Maximum percentage of any one species
10—19	50%
20—39	33%
40—59	25%
60 or more	15%

Section 3.2.1(D)(4) Parking Lot Perimeter Landscaping

Parking lot perimeter landscaping (in the minimum setback areas required by Section 3.2.2(J), Access, Circulation and Parking, shall meet the following minimum standards:

- (a) Trees shall be provided at a ratio of one (1) tree per twenty-five (25) lineal feet along a public street and one (1) tree per forty (40) lineal feet along a side lot line parking setback area. Trees may be spaced irregularly in informal groupings or be uniformly spaced, as consistent with larger overall planting patterns and organization. Perimeter landscaping along a street may be located in and should be integrated with the streetscape in the street right-of-way.
- (b) Screening. Parking lots with six (6) or more spaces shall be screened from abutting uses and from the street. Screening from residential uses shall consist of a fence or wall six (6) feet in height in combination with plant material and of sufficient opacity to block at least seventy-five (75) percent of light from vehicle headlights. Screening from the street and all nonresidential uses shall consist of a wall, fence, planter, earthen berm, plant material or a combination of such elements, each of which shall have a minimum height of thirty (30)

inches. Such screening shall extend a minimum of seventy (70) percent of the length of the street frontage of the parking lot and also seventy (70) percent of the length of any boundary of the parking lot that abuts any nonresidential use. Openings in the required screening shall be permitted for such features as access ways or drainage ways. Where screening from the street is required, plans submitted for review shall include a graphic depiction of the parking lot screening as seen from the street. Plant material used for the required screening shall achieve required opacity in its winter seasonal condition within three (3) years of construction of the vehicular use area to be screened.

Section 3.2.1(D)(5) Parking Lot Interior Landscaping

As required in Subsection 3.2.2(M)(1) Access, Circulation and Parking, six (6) percent of the interior space of all parking lots with less than one hundred (100) spaces, and ten (10) percent of the interior space of all parking lots with one hundred (100) spaces or more shall be landscape areas. (See Figure 1). All parking lot islands, connecting walkways through parking lots and driveways through or to parking lots shall be landscaped according to the following standards:

- (a) **Visibility.** To avoid landscape material blocking driver sight distance at driveway-street intersections, no plant material greater than twenty-four (24) inches in height shall be located within fifteen (15) feet of a curb cut.
- (b) **Maximized Area of Shading.** Landscaped islands shall be evenly distributed to the maximum extent feasible. At a minimum, trees shall be planted at a ratio of at least one (1) canopy shade tree per one hundred fifty (150) square feet of internal landscaped area with a landscaped surface of turf, ground cover perennials or mulched shrub plantings.
- (c) **Landscaped Islands.** In addition to any pedestrian refuge areas, each landscaped island shall include one (1) or more canopy shade trees, be of length greater than eight (8) feet in its smallest dimension, include at least eighty (80) square feet of ground area per tree to allow for root aeration, and have raised concrete curbs.

[Drawing not reproduced]

- (d) **Walkways and Driveways.** Connecting walkways through parking lots, as required in Subsection 3.2.2(B)(5)(a), Walkways, shall have one (1) canopy shade tree per forty (40) lineal feet of such walkway planted in landscape areas within five (5) feet of such walkway. Driveways through or to parking lots shall have one (1) canopy shade tree per forty (40) lineal feet of and along each side of such driveway, in landscape areas within five (5) feet of such driveway.
- (e) **Parking bays** shall extend no more than fifteen (15) parking spaces without an intervening tree, landscape island or landscape peninsula.

Section 3.2.1(F) Tree Preservation and Mitigation

- Existing significant trees (six (6) inches and greater in diameter) within the LOD and within natural habitat buffer zones shall be preserved to the extent reasonably feasible and may help

satisfy the landscaping requirements of this Section as set forth above. Such trees shall be considered "protected" trees within the meaning of this Section, subject to the exceptions contained in Subsection (2) below. Streets, buildings, and lot layouts shall be designed to minimize the disturbance to significant existing trees. All required landscape plans shall accurately identify the locations, species, size, and condition of all significant trees, each labeled showing the applicant's intent to either remove, transplant, or protect. Where it is not feasible to protect and retain significant existing tree(s) or to transplant them to another on-site location, the applicant shall replace such tree(s) according to the following requirements and shall satisfy the tree planting standards of this Section. To the extent reasonably feasible, replacement trees shall be planted on the development site or, if not reasonably feasible, in the closest available and suitable planting site on public or private property. The closest available and suitable planting site shall be selected within one-half (½) mile (2,640 feet) of the development site, subject to the following exceptions. If suitable planting sites for all of the replacement trees are not available within one-half (½) mile (2,640 feet) of the development, then the City Forester shall determine the most suitable planting location within the City's boundaries as close to the development site as feasible. If locations for planting replacement trees cannot be located within one-half (½) mile of the development site, the applicant may, instead of planting such replacement trees, submit a payment in lieu to the City of Fort Collins Forestry Division to be used to plant replacement trees to plant replacement trees as close to the development site as possible. The payment in lieu mitigation fee per tree is determined by the City Forester and may be adjusted annually based on market rates. Payment must be submitted prior to the Development Construction Permit issuance or other required permits.

- (1) A significant tree that is removed shall be replaced with not less than one (1) or more than six (6) replacement trees sufficient to mitigate the loss of contribution and value of the removed significant tree(s). The applicant shall coordinate with the City Forester to determine such loss based upon an onsite tree assessment, including, but not limited to, shade, canopy, condition, size, aesthetic, environmental and ecological value of the tree(s) to be removed. Replacement trees shall meet the following minimum size requirements unless otherwise determined by the City Forester:
 - (a) Canopy Shade Trees: 2.0" caliper balled and burlap or equivalent.
 - (b) Ornamental Trees: 2.0" caliper balled and burlap or equivalent.
 - (c) Evergreen Trees: 8' height balled and burlap or equivalent.
- (2) Trees that meet one (1) or more of the following removal criteria shall be exempt from the requirements of this subsection unless they meet mitigation requirements provided in Section 3.4.1(E)(1) of this Code:
 - (a) Dead, dying or naturally fallen trees, or trees found to be a threat to public health, safety, or welfare;
 - (b) Trees that are determined by the City to substantially obstruct clear visibility at driveways and intersections;

- (c) Siberian elm less than eleven (11) inches DBH and Russian-olive or ash (Fraxinus species) less than eight (8) inches DBH;
 - (d) Russian-olive, Siberian elm, and ash (all Fraxinus species) of wild or volunteer origin, such as those that have sprouted from seed along fence lines, near structures or in other unsuitable locations;
- (3) All existing street trees that are located on city rights-of-way abutting the development shall be accurately identified by species, size, location, and condition on required landscape plans, and shall be preserved and protected in accordance with the standards of Subsection (G).

Section 3.2.1(G) Tree Protection Specifications

The following tree protection specifications shall be followed to the maximum extent feasible for all projects with protected existing trees. Tree protection methods shall be delineated on the demolition plans and development plans.

- (1) Within the drip line of any protected existing tree, there shall be no cut or fill over a four-inch depth unless a qualified arborist or forester has evaluated and approved the disturbance.
- (2) All protected existing trees shall be pruned to the City of Fort Collins Forestry Division standards.
- (3) Prior to and during construction, barriers shall be erected around all protected existing trees with such barriers to be of orange construction or chain link fencing a minimum of four (4) feet in height, secured with metal T-posts, no closer than six (6) feet from the trunk or one-half (½) of the drip line, whichever is greater. Concrete blankets, or equivalent padding material, wrapped around the tree trunk(s) is recommended and adequate for added protection during construction. There shall be no storage or movement of equipment, material, debris or fill within the fenced tree protection zone. A tree protection plan must be submitted to and approved by the City Forester prior to any development occurring on the development site.
- (4) During the construction stage of development, the applicant shall prevent the cleaning of equipment or material or the storage and disposal of waste material such as paints, oils, solvents, asphalt, concrete, motor oil or any other material harmful to the life of a tree within the drip line of any protected tree or group of trees.
- (5) No damaging attachment, wires, signs, or permits may be fastened to any protected tree.
- (6) Large property areas containing protected trees and separated from construction or land clearing areas, road rights-of-way and utility easements may be "ribboned off," rather than erecting protective fencing around each tree as required in Subsection (G)(3) above. This may be accomplished by placing metal t-post stakes a maximum of fifty (50) feet apart and tying ribbon or rope from stake-to-stake along the outside perimeters of such areas being cleared.
- (7) The installation of utilities, irrigation lines or any underground fixture requiring excavation deeper than six (6) inches shall be accomplished by boring under the root system of protected

existing trees at a minimum depth of twenty-four (24) inches. The auger distance is established from the face of the tree (outer bark) and is scaled from tree diameter at breast height as described in the chart below. Low pressure hydro excavation, air spading or hand digging are additional tools/practices that will help reduce impact to the tree(s) root system when excavating at depths of twenty-four (24) inches or less. Refer to the Critical Root Zone (CRZ) diagram, Figure 2, for root protection guidelines. The CRZ shall be incorporated into and shown on development plans for all existing trees to be preserved.

Tree Diameter at Breast Height (inches)	Auger Distance From Face of Tree (feet)
0-2	1
3-4	2
5-9	5
10-14	10
15-19	12
Over 19	15

Section 3.2.1(I) Landscape Materials, Maintenance and Replacement

...

- (5) Maintenance. Trees and vegetation, irrigation systems, fences, walls, and other landscape elements shall be considered as elements of the project in the same manner as parking, building materials and other site details. The applicant, landowner or successors in interest shall be jointly and severally responsible for the regular maintenance of all landscaping elements in good condition. All landscaping shall be maintained free from disease, pests, weeds and litter, and all landscape structures such as fences and walls shall be repaired and replaced periodically to maintain a structurally sound condition.
- (6) Replacement. Any landscape element that dies, or is otherwise removed, shall be promptly replaced based on the requirements of this Section.

Recommended Changes

Definitions

The definition of “full tree stocking” in Section 4.3.2(D)(1)(c) is not a commonly used term in either zoning or in the landscaping profession outside of Fort Collins and is unlikely to be understandable to Fort Collins residents. In addition, the embedded definition of “landscape areas” is apparently intended to apply only in the context of “full tree stocking” but could easily be confused or misunderstood to be a general definition to other LUC uses of this common term (where it would not be applicable and could undermine the intent of the landscaping regulations.

- The definition of “full tree stocking” should be avoided if possible or should be clarified and simplified to be more understandable to residents and landscapers, and regulatory text should be removed. In general, definitions should only define terms, and related regulations

should appear in the regulatory standards applicable to the activities and places referred to in the definition.

- The use of a second, inconsistent, definition of “landscape area” should be avoided if possible. If that is not possible, then it should be either grouped near the general definition of that term so the difference is clear, or the general definition of “landscape area” should include a cross-reference to this term so that the reader understands that Fort Collins uses the term in two different ways.

Tree Preservation

For clarity, this portion of the report groups together recommendations on several themes identified by staff related to the preservation of existing trees prior to and during the development process, including:

- Tree inventories;
- Tree preservation during construction;
- Tree preservation for single-family residential development;
- Ash tree preservation; and
- Heritage tree program.

Tree Inventory

In many communities, well-intentioned regulations for to protect existing trees are undermined by lack of knowledge of what trees are on a particular property before development or redevelopment of the property is proposed or a concept plan or site plan is submitted. As recognition of the value of mature trees for carbon dioxide absorption, heat island mitigation, and the experience of nature has increased in recent years, some communities have adopted requirements that a tree inventory be prepared and presented to staff at the first concept plan meeting, so that protection of those trees can be better integrated into site design. In order to be effective, requirements for tree inventories need to clarify that not only the number and location, but the type, size, and health of the tree need to be shown, and should clarify that the City may compare the inventory to existing available aerial photography in order to verify the accuracy of the inventory.

A few cities have gone further to require that no trees may be removed (except those that are create public health or safety hazards or a risk of disease transmission to other trees) for a defined period of time following the inventory, or following concept review of a proposed development, in order to allow time for processing of subsequent applications. In our experience, however, regulations prohibiting removals during these preliminary stages of development are rare.

Because the removal of existing mature trees that could potentially be incorporated into site design would significantly undermine the goals of the Nature in the City program, we recommend that a tree inventory requirement be incorporated into the LUC. To be effective, we also recommend that the LUC include limits on overlot grading and tree removal for a period of time

prior to concept or site plan submittal or require more-than-mitigation for any tree removal in the final site plan.

- The LUC should clarify that a tree inventory describing the number, location, type, size, and health of existing trees on the property is required before Concept Review (or before the submittal of a Preliminary Design Plan or other site plan) unless waived by the Director based on the availability of recent aerial photography of the site or known site conditions. The detailed requirements for the inventory should be contained in a technical manual outside the LUC to allow for easier updating as technology changes without the need for a formal code amendment. For consistency with current Subsection 3.2.1(F)(3), this new provision should require that the inventory also include all street trees located on public property abutting the development lot or parcel. This new provision could appear as either:
 - An addition to Subsection 2.2.1(A)(3), Concept Plan Submittal; or
 - An addition to Subsection 3.2.1(C), General Standards, preceding the text that requires the submission of a landscaping plan.
- Revise Subsection 3.2.1(F), Tree Protection and Mitigation, to break up the very long introductory paragraph into more readable subsections, and to add a new first subsection prohibiting overlot grading and tree removal for a period of one year prior to Concept Plan submittal, and that if the City determines that has occurred, the applicant may be required to mitigate any removal of significant trees at up to twice the rate stated in current Subsection 3.2.1(F)(1).

Tree Protection During Construction

Sections 3.2.1(F) and (G) together require that all significant trees over six inches in diameter within the LOD and within natural habitat buffer zones be preserved to the extent reasonably feasible and allows those preserved trees to be used to satisfy other landscaping requirements. Trees required to be protected are shown on development construction plans (DCPs) and building permits. Section 3.2.1(G) lists the ways in which those trees must be protected, and those requirements are fairly typical of many tree protection ordinances.

Like many communities, however, Fort Collins does not have the staff or resources to monitor all development sites to ensure that existing trees that are required for preservation are protected from damage during the development process. Staff reports that many trees are in fact being damaged during this process. This suggests the need for a better approach that allows the City to confirm tree protection measures are in place prior to and throughout construction in order to minimize impacts to trees.

To address these weaknesses, we recommend the following changes:

- We assume that the introductory text of Section 3.2.1(F) that applies mitigation standards to the LOD and natural habitat buffers implies that significant trees (and other trees) outside those areas may not be removed (since that would be a disturbance of the site). However, if that is not how this provision is currently interpreted, Section 3.2.1(F) should be revised to

clarify that tree removal outside the LOD would constitute unauthorized site disturbance. In addition, if there are any development approvals that do not include the designation of a Limit of Disturbance on the development property, revise Section 3.2.1(F) to include all significant trees on the entirety of that development parcel.

- For clarity, and to distinguish the content of this Section from that of the previous Section addressing long-term tree preservation, Section 3.2.1(G) should be retitled “Tree Protection During Construction.”
- For readability, the long introductory text in Section 3.2.1(F) should be broken into smaller, labeled, subsections, each addressing a different requirement.
- Expand the applicability of Section 3.2.1(G)(1) to require that fencing be installed one foot beyond the dripline of each protected tree, and to clarify that chain link fencing or wooden slat fencing be required (not just plastic construction fencing).
- Revise Division 2.14.1, Enforcement, to note that provisions of the LUC may be enforced through the issuance of stop work orders. As an alternative, this section could be replaced with a cross-reference to general code enforcement powers in the new LUC, and those powers could include stop work orders in the list of possible enforcement tools for all violations of the code.
- Revise Division 2.14.2, to require an initial site inspection to confirm compliance with any pre-construction requirements (including but not limited to tree protection and mitigation requirements) before any overlot grading or site preparation may occur.
- Revisit the schedule of penalties in Section 3.8.16 to ensure that the applicable penalty for failure to protect significant trees during construction, and for unauthorized removal of trees, are large enough to deter those actions. See the discussion on Tree Removal Mitigation and Penalties below.

Residential Tree Preservation

Section 3.2.1, Landscaping and Tree Protection, exempts from all of its provisions “development on existing single-family detached dwellings”, which is true of many landscaping regulations in other communities. Because residential land makes up over 57 percent of the developed land area in Fort Collins, this exemption has a significant impact on the ability of the City to protect existing trees and tree canopy. The impact of this exemption has been compounded in recent years by increased allowance of Accessory Dwelling Units (ADUs), which could lead to the removal of additional trees in order to accommodate new construction of detached ADUs. The marginal contribution of ADUs to tree removal, however, is a much lower threat to maintenance of existing trees than the blanket exemption of all single-family detached dwelling lots from all provisions of Section 3.2.1.

In most communities, similar exemptions are driven primarily by the fact that the community has inadequate staff capacity to inspect and monitor the removal or planting of trees on so many individual residential lots, as well as the political reluctance to interfere with activities in this popular form of U.S. housing. Because of the impact of this exemption on the NIC goals, it may be time to revisit this exemption, or at least to limit it to smaller, more affordable lots that help protect the City’s affordable housing stock.

We recommend that the City consider the following changes to Section 3.2.1:

- Limit the single-family detached housing exemption to requirements for installation of new landscaping, but make those lots subject to the tree protection requirements of Sections 3.2.1(F) and (G); or
- Limit the single-family detached housing exemption to lots under 5,000 square feet in area; or
- Require the designation of Limits of Development (within which tree protection provisions would apply) on all residential single-family detached lots over 5,000 square feet in area.

Because of the potential contribution of ADUs to more affordable housing, we do not recommend a separate program for protection of individual trees during the ADU process unless or until the broader weaknesses in the current exemptions listed above have been considered.

Ash Tree Preservation

Although Emerald Ash Borer (EAB) is present in Fort Collins and has been impacting Ash trees (*Fraxinus* species) in the community, the Forestry Division believes that many existing Ash trees continue to contribute to the urban tree canopy and provide benefits to the community. Because they are generally mature trees with significant tree canopy, their preservation (where possible) would contribute to needed tree diversity, and because the risks of spreading the EAB is not limited to those Ash trees located in the street right-of-way, their protection on private property would also contribute to achievement of Nature in the City goals and objectives. When Ash trees are located in the street right-of-way adjacent to a proposed development property, Section 3.2.1(D)(2)(d) requires coordination with the City Forester and possible protection or mitigation measures, but those same protections do not apply to Ash trees located on private property.

To address this issue, we recommend that the City:

- Establish a new Subsection 3.2.1 (E), Ash Tree Protection and Mitigation, that contains the text of Section 3.2.1(D)(2)(d) modified to apply to *Fraxinus* species located on both private and public property. As an alternative, the City could retain the regulations in current Section 3.2.1(D)(2)(d) and create a parallel provision applicable to private property as a new Subsection 3.2.1(F)(4).

Heritage Tree Program

Although Fort Collins current regulations protect “significant trees,” those trees are only required to be preserved “to the extent reasonably feasible,” and when that that is not the case, on- and off-site mitigation by up to six trees as well as payment of an in-lieu fee are available. Because of the higher value of larger trees to carbon dioxide absorption, heat island mitigation, and the perception of Nature in the City, some communities have gone further to create additional protections for very large trees. Often this takes the form of a heritage tree designation and program with higher standards for preservation, higher levels of required approval for removal, and stricter or higher requirements for mitigation. In addition to establishing those higher standards, creation of a heritage tree program would require Fort Collins to establish criteria for designation of heritage trees and a process for designating them.

The protection of heritage trees, beyond standards like those for existing significant trees, is not typical. Instead, heritage tree programs are often voluntary and intended to encourage preservation and maintenance through pride of ownership. In some cases, participation in a heritage tree program is incentivized through City efforts to support heritage tree maintenance.

Because of the importance of Nature in the City goals within Fort Collins planning process, we recommend that the City consider the following changes:

- Retitle Section 3.2.1(F) as “Significant Tree Protection and Mitigation,” creating a new Section 3.2.1(G) titled “Heritage Tree Protection and Mitigation,” and re-lettering the following Subsections accordingly.
- Redefining significant trees to be those between four- and 10-inches diameter at breast height (DBH) that do not otherwise meet the definition of a heritage tree.
- Defining heritage trees as those larger than 10 inches DBH as well as those that the City Forester determines (a) contribute to the historic character of a designated historic landmark or districts, (b) are associated with a notable person or historic event, (c) are landmarks in the community, or (d) have horticultural significance due to rarity in the community.
- Clarifying that the City Forester may initiate an application for designation of a heritage tree on any property, a private property owner may initiate an application to designate a heritage tree on property he or she owns, and that Planning Commission approval would be required following a public hearing in either case. Any member of the community may contact the City Forester to informally recommend a heritage tree, but the Forester is not obligated to investigate or act on each such recommendation.
- Establishing a list and GIS layer for designated heritage trees.
- Offering that care and maintenance of designated heritage trees shall be provided by the City, and at City expense, if requested by the property owner.
- Providing that a heritage tree may only be removed if preservation of the tree would result in the value of the property for uses listed as permitted uses in its current zoning district being reduced by 25 percent or more, as established by an appraisal acceptable to the City, unless the City approves zoning changes or development variances needed to offset the diminution in value.
- In addition, to provide a significant incentive for preservation of larger old trees, Subsection 3.2.1(F) could be revised to provide that the preservation of each “significant tree” shall create a credit of two inches of DBH for each DBH of the preserved tree against tree plantings required by other landscaping regulations. Although resulting in fewer total DBH in new tree plantings, some cities conclude that the benefits of preserving larger trees are worth this tradeoff.

Tree Planting

This section addresses themes identified by staff related to the provision and planting of trees, including:

- Escrow for street tree establishment;

- Species diversity; and
- Parking lot heat island mitigation.

Escrow for Street Tree Establishment

Fort Collins currently requires planting of street trees generally every 30 to 40 feet along streets. In cases where the street features an attached sidewalk “that fails to comply with the Larimer County Urban Area Street Standards,” trees are then required to be planted behind the sidewalk at the same spacing intervals. The City also enforces standards that require trees to be set back from driveways and alleyways by eight feet and from streetlights by 40 (shade trees) or 15 (ornamental trees) feet.

Although it often takes three to five years for a street tree to become fully established, the current warranty period for street improvements is only two years. Currently, standards are applied during the development approval process (at the time of planting), which makes enforcement easier because the City has leverage over the issuance of development permits. For large new developments, street tree permits are issued after installation, not establishment. However, staff notes that required trees are often not well-maintained following development leading to many trees that die and require removal (and that should require replacement) between the end of the warranty period but before trees become established.

Other communities that have addressed this issue sometimes require that an escrow fund be created to replace trees that die during a specified period of time after the warranty is released. However, monitoring and maintenance of escrow accounts tends to be complex and time consuming and is more often limited to high-cost infrastructure such as roads and utilities. To avoid the cost and complexity of operating an escrow program, other communities simply require that the property owner (not the applicant or developer) remains responsible for the continued survival or the replacement) of street trees and all other landscaping required to be installed as a condition of site approval. Fort Collins already has those regulations in place in Sections 3.2.1(l)(5) and (6). Rather than establishing an escrow program to guarantee the survival of street trees until fully established, we recommend that the City focus on more pro-active enforcement of those existing regulations. Enforcement details are an administrative matter subject to staffing and budget constraints and should not be codified in the LUC.

Tree Species Diversity

Currently, Section 3.2.1(D)(3) of the LUC states that required trees meet a certain level of species diversity for the overall site, depending on the number of trees on the site, in order to reduce the creation of monocultures that increase the chances of disease spread and other arboriculture challenges. Forestry Division staff have recommended increasing the standards for overall species diversity as shown in the following table. Based on recent development codes that we have researched or authored, Clarion is not aware of a “standard” approach to species diversity, and we have no objection to replacement of the current standards with the proposed requirements shown in the table. We note that both the current and proposed requirements for species diversity are more detailed than those used in many other communities.

Number of Trees on Site	Current Percent of Any One Species (Max.)	Proposed Percent of Any One Species (Max.)
10-19	50%	40%
20-39	33%	30%
40-59	25%	20%
60+	15%	10%

Forestry Division staff have also noted that the current standard only requires diversity based on the number of trees on the entire development site, and therefore does not require diversity among new street tree plantings, all of which could be of the same species as long as the required mix of species was achieved elsewhere on site. The City and County of Denver currently requires that no more than two consecutive street trees of the same species may be planted in a continuous row, including around corners and in groupings, in order to provide particular protection against disease for the most visible evidence of urban forestry (i.e., along public streets).

Fort Collins staff requested that Clarion assess the viability of a similar standard (no more than three consecutive trees of one species) in the new LUC. Our research suggests that, despite a historic preference for consistent rows of trees of a single species along parkways and other highly visible street frontages, the advantages of street tree diversity requirements outweigh their disadvantages, primarily because of the risk that a new disease or blight (such as the Ash borer or the Chestnut blight) could rapidly eliminate a public and environmental value that took decades to grow and mature, and because that risk is avoidable at little cost. We would therefore support a strengthened standard for street tree diversity but would not recommend that stricter standards be applied to all tree plantings on a development site because of the difficulty of monitoring and enforcement over time. This change could be achieved by the following:

- Revise Section 3.2.1(D)(3) by relabeling the current standards as Subsection (a) and adding a new Subsection (b) requiring that no more than two adjacent street trees be of the same species.

Parking Area Heat Island Reduction

LUC Sections 3.2.1(D)(4) and (5) include relatively detailed requirements for the installation of trees along the perimeters of, and in the interiors of, parking lots. This approach is relatively new for the City and replaces previous standards that were vague and required the City to negotiate for quality parking area layouts and landscaping elements. Installation of generous landscaping in larger surface parking lots is important to achieving the Nature in the City goals, both because the views of large expanses of uninterrupted asphalt create an experience almost the opposite of natural areas, but because unshaded expanses of asphalt create significant heat islands that are inconsistent with the cooler temperatures experienced outside of urban areas. For these reasons,

we assume that Fort Collins wants to be a leader in avoiding unshaded surface parking lots as new development and redevelopment occurs.

Although no two medium or large cities appear to regulate parking lot landscaping in the same way, Fort Collins' current standards are generally consistent with those found in newer land development codes, with a few exceptions. Many of the key terms used in the current LUC are undefined and could be applied more effectively and consistently if those definitions were added. In addition, while the levels of tree planting required are fairly consistent with those found for medium to high density areas, they are lower than those applied in some suburban areas. An increasing number of cities vary not only the number of parking spaces required, but also the amount of parking lot landscaping required, based on the level of "urbanism" existing or desired in different parts of the city. Finally, some newer codes include requirements for the installation of "terminal islands"—planted islands dividing the end of each row of parking spaces from drive aisles and driveways, which also tends to spread out required tree plantings and increase the amount of surface asphalt they shade.

To address these weaknesses, the LUC could be amended as follows:

- Revise Section 5.1.2, Definitions, to include clear definitions accompanying graphics for "landscaped island," "landscaped peninsula," "pedestrian refuge," "driveway," "parking space" and "terminal island." Ensure that the definition of "landscaped island" includes a "terminal island." Currently, it is unclear if a driveway includes both vehicle access points to/from a street and drive aisles between parking stalls. In addition, it appears that the terms "parking spaces" and "parking stalls" are used interchangeably, and we recommend using only one term consistently throughout the LUC.
- When defining "landscape islands," require that they be designed as swales below the level of the parking surface, so that stormwater flows into these areas rather than off the parking lot into engineered stormwater systems. While freestanding curb stops can still be required to protect landscaping from damage by cars, the elimination of continuous curbing and artificially elevated landscaped areas helps promote a more natural appearance for parking areas, as well as allowing for natural filtration and treatment of at least part of stormwater falling on the parking lot.
- Add a new Subsection 3.2.1(D)(5)(b) to add a provision requiring the creation of terminal islands to separate the end of each row of parking space from driveways and internal drive aisles and requiring that the terminal island extend the full length of the parking space that it abuts.
- Consider revising Subsection 3.2.1(E)(5) to provide that in Fort Collins lower intensity zoning districts – i.e., those with a more suburban character – a minimum of 14 percent of the interior of parking lots with more than 100 spaces be landscaped.

Tree Removal Mitigation and Penalties

This section of the Audit addresses themes identified by staff related to the removal and mitigation of removed trees, including:

- Tree mitigation; and
- Penalty for tree removal after commercial development.

Tree Removal Mitigation

Over the past years, Fort Collins has experienced the illegal removal of required trees by commercial developments, and Forestry Division staff have noted that the LUC penalty for doing so does not deter this behavior or provide the City with the resources to mitigate the damage of illegal removals to the experience of Nature in the City. If the removed tree was a “significant tree,” Section 3.2.1(F) requires mitigation with between one and six trees, but staff indicates that often only one mitigation tree is required. For smaller trees, no mitigation is required or enforced. Replacements for significant trees removed must meet the minimum size requirements of Section 3.2.1(D)(4), but those are not related to the size of the tree removed. The result is often the loss of an established, healthy tree and the planting of a new tree that is years from being able to replace the shade and quality of the removed tree. The current LUC requires on-site mitigation, but where not feasible mitigation trees may be planted within one-half mile of the development site. In rare cases, the City allows payment in lieu as determined by the City Forester.

We understand that Fort Collins’ Forestry Division staff are currently in the process of drafting a detailed proposal for LUC changes to address these weaknesses, but we will limit our recommendations to those often found in newer development codes in other communities. Generally, these provisions try to address the illegal removal of trees that were required to be planted or were required to be preserved because they are shown on approved site plans and are necessary for compliance with landscaping standards.

The weaknesses identified above could be addressed by the following revisions to the LUC during the code rewrite process.

- Because of the priority that Fort Collins places on the experience of Nature in the City, the definition of a “significant tree” should be revised to apply to all trees over four inches DBH. The four-inch DBH standard is currently used by the City of Boulder. The definition of “significant tree” in Section 5.1.2 would need to be revised accordingly.
- Because of the importance of larger trees to carbon dioxide absorption, heat island prevention, and the NIC goals, Section 3.2.1(F) should be revised to require mitigation at a two-inches-per-DBH-inches of each significant tree removed. This would require documentation of not just the location but also the DBH of each existing tree shown on an approved site plan.
- In addition, Section 3.2.1(F), Tree Preservation and Mitigation, should be revised to add a Subsection requiring mitigation for removal of any tree under two inches DBH shown on an approved site plan and necessary for compliance with the City’s landscaping standards or the conditions of site plan approval to be mitigated on an inch-to-inch, rather than tree-to-tree basis.

- The current requirement for on-site mitigation if possible, and for plantings within one-half mile if that is not feasible, is similar to that used in other communities. However, this regulation could be strengthened by requiring that the off-site mitigation be as close as reasonably practicable to the subject site, and by clarifying that those mitigation plantings can occur in the parkways on public-rights-of-way that do not currently comply with street tree standards (with the permission of the City).

Penalty for Tree Removal after Commercial Development

While most newer development codes focus on mitigating the impacts of illegal tree removal through stronger mitigation standards, some communities have also adopted enhanced financial penalties to encourage the practice. While these are not common, they are usually limited to cases of illegal tree removal on multi-family, commercial, mixed-use, industrial, and institutional properties. They generally do not apply to single-family or low-density residential properties because of the difficulty of monitoring and enforcing tree removal on properties where the existing trees have not been documented (and because of the political unpopularity of enforcement actions against these types of properties).

As an example, the City of Seattle, Washington, imposes a financial penalty based on the size of the illegally removed tree and equal to three times the environmental value of the removed tree to the community. However, our discussions with Seattle staff suggest that the fine is rarely enforced and may not be effective in discouraging illegal tree removal. In general, we believe that even very high monetary penalties may not be effective in discouraging tree removals that are motivated by market driven development opportunities that create much greater value to the property owner, and that focusing on strengthening enforcement and mitigation regulations may be more effective in minimizing reductions in tree canopy due to illegal tree removals. While it is useful to periodically revise zoning enforcement penalties to ensure that they are internally consistent, that they compound daily after notice from the City and a reasonable period to cure the violation, and high enough to encourage prompt action by the landowner after they begin to accrue, we do not recommend an increase in tree removal penalties separate from a thoughtful periodic update process.

4. Additional Recommendations

We also recommend the following changes to the LUC and the Municipal Code to further promote the Nature in the City program.

- The purpose statement for the Landscaping and Tree Protection regulations in Section 3.2.1(B) does not clearly reflect the goals of the Nature in the City initiative and should be revised to do so. The purpose statement could be strengthened by explicitly referencing the City's intent to increase tree survival rates, to protect and expand tree canopy, to reduce unauthorized removal of trees before and after construction, to reduce damage to trees during construction, and conserve water, and to avoid the creation of monocultures.
- The requirements for obtaining permits related to trees in public places described in Municipal Code Sections 27-31 and 27-32 should be cross-referenced in LUC Section 3.2.1, in

order to put private property owners on notice that City approval may be required to alter trees on a public parkway adjacent to their property (and that they may not understand is on public property).

- The duties of each property regarding trees on their property contained in Municipal Code Section 27-57 and 27-58 should also be cross-referenced in LUC Section 3.2.1, as many property owners may be unfamiliar with those duties.